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ON SUPERFAMILY LIOSPHAERICAE
(RADIOLARIA) FROM SEDIMENTS IN
THE SEA NEAR ANTARCTICA ON
RADIOLARIA FROM SEDIMENTS IN
THE SEA NEAR ANTARCTICA, PART I

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BIOLOGICAL RESULTS
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THE JAPANESE ANTARCTIC RESEARCH EXPEDITION
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FROM SEDIMENTS IN THE SEA NEAR ANTARCTICA

ON RADIOLARIA FROM SEDIMENTS IN THE
SEA NEAR ANTARCTICA, PART I

BY

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WHEN the Second Japanese Antarctic Research Expedition (1957-8) was carried out, sediments in the sea near the Antarctica were collected. The writer had an opportunity to study the Radiolaria contained in these sediments. materials were examined, and seven of them contained specimens belonging The to the superfamily Liosphaericae. The writer described in the present paper 14 species, most of which have not been reported before. The stations of materials which were sampled are shown in Table 1, and the distribution of species is

Table 1. List of the localities of samples.

Station No.	Geographic	Position	Depth (m)	Date of collecting
1	S 68°09'	E 34°35'	830	26th, Jan. 1958
2	S 68°09'	E 34°12'	830	27th, Jan. 1958
3	S 68°09'	E 34°12'	500	28th, Jan. 1958
4	S 68°30'	E 31°58'	350	31st, Jan. 1958
5	S 68°17'	E 31°38'	700	1st, Feb. 1958
6	S 68°17'07"	E 31°38'00"	590	1st, Feb. 1958
7	S 68°19'07"	E 31°22'00"	580	2nd, Feb. 1958
8	S 68°19'	E 31°22'	100	2nd, Feb. 1958
9	S 68°31'	E 37°12'	570	8th, Feb. 1958
10	S 68°33'	E 36°45'	530	10th, Feb. 1958

Table 2. Distribution chart.

	4	5	6	7	8	9	10
<i>Liosphaera</i> (<i>Craspedomma</i>) <i>antarctica</i> n. sp.			r				
<i>Cenosphaera</i> (<i>Cyrtidosphaera</i>) <i>antarctica</i> n. sp.		c	c		r	a	
<i>C.</i> (<i>Cyrtidosphaera</i>) <i>yosii</i> n. sp.		r	r				
<i>C.</i> (<i>Cyrtidosphaera</i>) α sp.		r					
<i>C.</i> (<i>Phormosphaera</i>) <i>nagatai</i> n. sp.			r				
<i>C.</i> (<i>Phormosphaera</i>) β sp.			r				
<i>Thecosphaera</i> (<i>Thecosphaera</i>) <i>miocenica</i> Nakaseko			c			c	
<i>T.</i> (<i>Thecosphaeromma</i>) <i>antarctica</i> n. sp.		c	a	r		a	r
<i>Cromyosphaera</i> <i>nipponica</i> n. sp.						r	
<i>Actinomma</i> (<i>Actinomma</i>) <i>yosii</i> n. sp.	r		r			r	
<i>A.</i> (<i>Actinomma</i>) α sp.			r				
<i>A.</i> (<i>Actinommilla</i>) <i>capillaceum</i> n. sp.						r	
<i>A.</i> (<i>Actinommilla</i>) <i>erinaceum</i> n. sp.						r	
<i>A.</i> (<i>Actinommura</i>) <i>antarctica</i> n. sp.	c	r	c			c	r

r: rare c: common a: abundant

shown in Table 2. Holotype and paratype of the new species, and other specimens are preserved in the Institute of Geological Sciences, Osaka University.

It is impossible to discuss thoroughly Antarctic Radiolarian faunas, as the number of material examined is very small. Therefore, the writer makes only the description of species in this paper.

The writer wishes to express his sincere thanks to Dr. Riozo YOSII of the Biological Laboratory, Yoshida College, University of Kyoto for giving the opportunity to carry out this study.

Description of Species

Family Liosphaeridae HAECKEL, 1882

Subfamily Liosphaerinae HAECKEL, 1882

Genus *Liosphaera* HAECKEL, 1882

Subgenus *Craspedomma* HAECKEL, 1887

Liosphaera (Craspedomma) antarctica n. sp.

(Plate I, Fig. 1 a, b, c; Fig. 2 a, b, c)

Description.—Shell very large, globular, with two concentric spheres, and with spiny surface; cortical shell very thin-walled, with about 18 pores across the diameter; these pores large, subregular, subhexagonal or subpolygonal, dissimilar in size, and with thin bars; surface of the outer cortical shell very spiny or thorny, these spines short, conical, beginning at each node of the meshworks; inner cortical shell in the ratio of about 0.7 to 1 of the outer cortical shell in diameter, entirely globular, with thicker wall than the outer cortical shell, and with about 18 pores; its pores subhexagonal, regular, small, nearly similar in size, with the hexagonal frame-works; radial beams thin, rodlike, numerous.

Measurement of the illustrated specimens:

	Pl. I, fig. 1	Pl. I, fig. 2
Diameter of the outer cortical shell	170 μ	175 μ
Diameter of the inner cortical shell	125 μ	112 μ
Diameter of the pores of the outer cortical shell	10-20 μ	12-20 μ
Diameter of the pores of the inner cortical shell	4-6 μ	8-10 μ
Breadth of the bars of the outer cortical shell	2 μ	1.5 μ
Breadth of the bars of the inner cortical shell	3 μ	3 μ
Thickness of the wall of the outer cortical shell	2 μ	2 μ
Thickness of the wall of the inner cortical shell	4 μ	4 μ

Remarks:—The specimens are rarely found in the collection. *Liosphaera antarctica* n. sp. resembles *L. hexagonia* HAECKEL (HAECKEL, 1887, p. 76, pl. 20, fig. 3) reported from the Central Pacific in that the wall of the outer cortical shell is very thin, which the wall of the inner cortical shell is thick. However, the latter has regular pores, and has smooth surface. Therefore, it should belong to the other subgenus (*Liosphaera*). But the two species have many common features, so the present writer considers that they are closely related to each other.

Locality:—Station No. 6.

Subfamily Ethmosphaerinae HAECKEL, 1862

Genus *Cenosphaera* EHRENBURG, 1854

Subgenus *Cyrtidosphaera* HAECKEL, 1862

Cenosphaera (Cyrtidosphaera) antarctica n. sp.

(Plate I, Fig. 3–6)

Description:—Shell very large, globular, moderately thick-walled, and with rough surface; pores very irregular, variable in size and number, circular or subcircular, generally large, with moderately thick bars, and with thin polygonal frames; surface of the wall spiny, its spines extremely short, arising at each node of the meshworks.

Measurement of the illustrated specimens:

	Diameter of the shell	Diameter of the pores	Thickness of the wall
Fig. 3	235 μ	10–35 μ	6 μ
Fig. 4	280 μ	5–35 μ	6 μ
Fig. 5	268 μ	8–25 μ	8 μ
Fig. 6	215 μ	8–28 μ	4 μ

Remarks:—This species is one of the most widely distributed species in this area, and the individual number in every station is very large. It is found associated with *Thecosphaera antarctica* n. sp. described below. It differs from the other species of the subgenus.

Localities:—Station Nos. 5, 6, 8 and 9.

Cenosphaera (Cyrtidosphaera) yosii n. sp.

(Plate II, Fig. 4)

Description:—Shell small, entirely globular, rather thick-walled, and with

rough surface ; pores circular or subcircular, fairly uniform in size, but smaller ones scattered among larger ones, generally well-spaced, with fairly thick bars, shallowly set into the subhexagonal frames, and numbering about 12 across the diameter ; surface of the shell spiny, its spines very short, conical, distally sharp, arising at each node of the meshworks.

Measurement of the illustrated specimen :—Diameter of the shell, 130μ ; that of the pores, $8-20\mu$; breadth of the bars, $4-8\mu$; thickness of the wall, 5μ .

Remarks :—The specimens are found rarely in the materials. They resembles *Cenosphaera mellifica* HAECKEL (HAECKEL, 1887, p. 62, pl. 12, fig. 10) reported from the South Pacific, Station 288, but differ from the latter in having the irregular pores.

Localities :—Station Nos. 5 and 6.

Cenosphaera (Cyrtidosphaera) α sp.

(Plate II, Fig. 5)

Description :—Shell small, entirely globular, thin-walled, and with rough surface ; pores circular, fairly uniform in size, but smaller ones scattered among larger ones, generally well-spaced, with fairly thick bars, with thin subhexagonal frames, and numbering about 14 across the diameter ; surface of the shell spiny, its spines very short, not sharp at distal end, arising at each node of the meshworks.

Measurement of the illustrated specimen :—Diameter of the shell, 120μ ; that of the pores, $3-8\mu$; breadth of the bars, $3-5\mu$; thickness of the wall, 3μ .

Remarks :—*Cenosphaera α sp.* is represented only by one specimen in the collection. It is somewhat similar to *C. yosii* n. sp. above described, but this species has smaller pores and shell.

Locality :—Station No. 5.

Subgenus *Phormosphaera* HAECKEL, 1882

Cenosphaera (Phormosphaera) nagatai n. sp.

(Plate II, Figs. 1 a, b ; 2)

Description :—Shell entirely globular, small, with moderately thick wall, and rough surface ; pores circular, uniform in size, well-spaced, with thin bars, and thin hexagonal frames, and numbering about 14 across the diameter ; surface of the shell spiny, its spines extremely short, arising at each node of the hexagonal meshworks.

Measurement of the illustrated specimens:

	Diameter of the shell	Diameter of the pores	Breadth of the wall	Thickness of the bars
Fig. 1	125 μ	10 μ	6 μ	3 μ
Fig. 2	112 μ	8 μ	5 μ	2 μ

Remarks:—*Cenosphaera nagatai* n. sp. resembles *C. favosa* HAECKEL (HAECKEL, 1887, p. 62, pl. 12, fig. 10), but differs in that the diameter of the shell of the former is smaller, and that the number of the pores is small. The occurrence of this species in this area is comparatively rare.

Locality:—Station No. 6.

Cenosphaera (Phormosphaera) β sp.

(Plate II, Fig. 6 a, b)

Description:—Shell rather small, entirely spherical, thick-walled, and with rough surface; pores circular, uniform in size, as broad as the bars, deeply set, with the hexagonal frames, and numbering about 12 across the diameter; surface of the shell being generally roughened with the small sepaloid points.

Measurement of illustrated specimen:—Diameter of the shell, 154 μ ; that of the pores, 8 μ ; breadth of the bars, 8 μ ; thickness of the wall, 12 μ .

Remarks:—The specimens are very rarely found in this collection. They differ from *Cenosphaera nagatai* n. sp. above described in that the bars of the former have the width nearly equal to the diameter of the pores, and the wall is thick.

Locality:—Station No. 6.

Subfamily Thecosphaerinae HAECKEL, 1882

Genus *Thecosphaera* HAECKEL, 1882

Subgenus *Thecosphaera* HAECKEL, 1882

Thecosphaera (Thecosphaera) miocenica NAKASEKO

(Plate II, Fig. 3)

Thecosphaera (Thecosphaera) miocenica, NAKASEKO, 1956.

Description:—Shell entirely globular, spiny, and with three concentric spheres in the ratio of 0.33, and 0.16 to 1 of the outer shell in diameter respectively; cortical shell with moderately thick wall, surface with about 14–16 pores across the diameter; these pores fairly small, circular, regular, uniform in size, deeply

set, and with the hexagonal frames; surface of the cortical shell spiny, its spines extremely short, arising at each node of the hexagonal meshworks; secondary medullary shell with seven pores across the diameter, its pores circular, uniform in size, and thick bars connected with the cortical shell by supporting beams; primary medullary shell very small.

Measurement of the illustrated specimen:—Diameter of the cortical shell, 120μ ; that of the secondary medullary shell, 40μ ; that of the primary medullary shell, 20μ ; that of the pores of the cortical shell, 8μ ; thickness of the wall of the cortical shell, 10μ .

Remarks:—The character of the specimens is almost identical with that of type specimen. They are common in the samples from this area. This species has previously been reported from the Miocene strata of Japan by the present writer.

Localities:—Station Nos. 6 and 9.

Subgenus *Thecosphaeromma* HAECKEL, 1887

Thecosphaera (*Thecosphaeromma*) *antarctica* n. sp.

(Plate II, Figs. 7, 10 a, b)

Description:—Shell very large, globular, and with three concentric spheres in the ratio of 0.3, and 0.15 to 1 of the cortical shell in diameter respectively; meshworks of the cortical shell similar to those of *Cenosphaera antarctica* n. sp., its pores dissimilar in size, very irregular, circular or subcircular, numbering 20 across the diameter, and with thin polygonal frames; surface of the cortical shell spiny, its spines extremely short, conical, arising at each node of the polygonal frames; secondary medullary shell rather small, with seven pores across the diameter, its pores fairly large, subhexagonal, uniform in size, with thick bars; primary medullary shell with three pores across the diameter, its pores similar to those of secondary medullary shell; radial beams numerous, thick, rodlike, connected at each sepaloid point.

Measurement of the illustrated specimens:

	Pl. II, fig. 10	Pl. II, fig. 7
Diameter of the cortical shell	324 μ	340 μ
Diameter of the secondary medullary shell	100 μ	120 μ
Diameter of the primary medullary shell	40 μ	52 μ
Diameter of the pores of the cortical shell	8-30 μ	8-30 μ

Remarks:—This species abundantly occurs in the samples. The cortical shell

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of this species resembles that of *Cenosphaera antarctica* n. sp., and these two species are found associated with each other. From these facts, the writer considers that these species are perhaps closely related to each other.

Localities:—Station Nos. 5, 6, 7, 9 and 10.

Subfamily Cromyosphaerinae HAECKEL, 1882

Genus *Cromyosphaera* HAECKEL, 1882

Cromyosphaera nipponica n. sp.

(Plate III, Fig. 1 a, b)

Cromyosphaera α sp., NAKASEKO, 1956.

Description:—Shell very large, globular, and with four concentric spheres in the ratio of 0.8, 0.35, and 0.15 to 1 of the outer cortical shell in diameter respectively; the two outer shells may be considered cortical shells and two inner medullary shells; meshworks of the outer cortical shell similar to those of *Cenosphaera antarctica* n. sp., its pores dissimilar in size, very irregular, circular or subcircular, numbering twenty across the diameter, and with thin polygonal frames; surface of the outer shell spiny, its spines extremely short, conical, arising at each node of the outer cortical shell; inner cortical shell similar to the meshworks of the outer cortical shell, its bars somewhat thinner than those of the outer shell; medullary shell rather small, with seven pores across the diameter, its pores fairly large, subhexagonal, uniform in size, with thick bars; primary medullary shell with about three pores across the diameter, its pores similar to those of the secondary medullary shell; radial beams numerous, thick, rodlike, connected at each sepaloid point.

Measurement of the illustrated specimen:—Diameter of the outer cortical shell, 365μ ; that of the inner cortical shell, 280μ ; that of the secondary medullary shell, 130μ ; that of the primary medullary shell, 55μ ; that of the pores of the outer cortical shell, 10– 30μ .

Remarks:—The specimens are rarely found in this collection. They resemble *Thecosphaera antarctica* n. sp. above described, but have four concentric spheres. Among *Cenosphaera antarctica*, *Thecosphaera antarctica* and this species, texture of meshworks of the outer shell is similar, and they are perhaps closely related to one another.

The character of this species resembles that of *Cromyosphaera* α sp. NAKASEKO described by the writer from the Miocene strata of Japan. The latter is represented by only one specimen and has smaller shell than in the former. The writer considers that they belong to the same species.

Locality:—Station No. 9.

Family Astrosphaeridae HAECKEL, 1882

Subfamily Actinommatinae HAECKEL, 1862

Genus *Actinomma* HAECKEL, 1862Subgenus *Actinomma* HAECKEL, 1862*Actinomma (Actinomma) yosii* n. sp.

(Plate II, Fig. 8 a, b; Fig. 9 a, b)

Description:—Shell rather small, entirely globular, with three concentric spheres, and 12 radial spines; these spines straight, fairly short, about 0.3, the diameter of the cortical shell in length, swordlike, with three blades; cortical shell globular, with about ten to fourteen pores across the diameter; its pores small, regular, circular, fairly uniform in size, deeply set into the thick wall, and with the hexagonal frames; surface of the shell being generally roughened with the small sepaloid points; secondary medullary shell in the ratio of about 0.3 to 1 of the cortical shell in diameter, with thin wall, and with about seven pores across the diameter, its pores small, regular, circular, uniform in size, with fairly thin bars; primary medullary shell in the ratio of about 0.15 to 1 of the cortical shell in diameter; supporting beams rodlike, thin, 12 in number, and internal extensions of the main radial spines.

Measurement of the illustrated specimens:

	Pl. II, fig. 8	Pl. II, fig. 9
Length of the radial spines	35 μ	30 μ
Diameter of the cortical shell	120 μ	108 μ
Diameter of the secondary medullary shell	40 μ	40 μ
Diameter of the primary medullary shell	16 μ	16 μ
Diameter of the pores of the cortical shell	8 μ	8 μ
Diameter of the pores of the secondary medullary shell	4 μ	4 μ

Remarks:—*Actinomma yosii* n. sp. is common in the samples from this area. The texture of the shell of this species resembles that of *Thecosphaera miocenica* NAKASEKO, but the latter has not the radial spines.

Localities:—Station Nos. 4, 6 and 9.

Actinomma (Actinomma) α sp.

(Plate III, Fig. 4 a, b)

Description:—Shell rather small, subglobular, with three concentric spheres, and 12 radial spines; these spines straight, in the ratio of about 0.23 to 1 of

the diameter of the cortical shell in length, triangular, swordlike, three-bladed, with the concave interface, and sharp in the distal end; cortical shell subglobular, with 14 pores across the diameter; these pores small, regular, circular, fairly uniform in size, with the hexagonal frames; surface of the cortical shell spiny, its spines extremely short, arising at each nodal point of the meshwork; secondary medullary shell small, globular, in the ratio of about 0.4 to 1 of the cortical shell in diameter, with 8 pores across the diameter, its pores small, regular, circular, with fairly thick bars, uniform in size; primary medullary shell in the ratio of 0.2 to 1 of the cortical shell in diameter, with 5 pores across the diameter, its pores small, regular, circular, uniform in size, with fairly thick bars; supporting beams rodlike, thin, seven of them visible in one plane.

Measurement of the illustrated specimen:—Length of the radial spines, 28μ ; diameter of the cortical shell, 120μ ; that of the secondary medullary shell, 50μ ; that of the primary medullary shell, 25μ ; that of the pores of the cortical shell, 10μ .

Remarks:—The specimens are rarely found in the samples. They are similar to *Actinomma yosii* n. sp. above described, but differ from the latter in that the cortical shell is subglobular, and has thinner wall.

Locality:—Station No. 6.

Subgenus *Actinommilla* HAECKEL, 1887

Actinomma (Actinommilla) capillaceum n. sp.

(Plate III, Fig. 2 a, b)

Description:—Shell very large, with three concentric spheres, and with numerous radial spines; these spines short in proportion to the length of the cortical shell, triangular, slender, very numerous in number, bristle-shaped; cortical shell subglobular, with about 12 pores across the diameter; these pores large, irregular, polygonal, dissimilar in size, with thin bars; wall of the cortical shell very thin in proportion to the diameter of the shell; secondary medullary shell in the ratio of about 0.46 to 1 of the cortical shell in diameter, with about six pores, its pores large, polygonal, dissimilar in size, with thin bars; primary medullary shell in the ratio of about 0.2 to 1 of the cortical shell in diameter, with about four pores, its pores large, fairly regular, sub-hexagonal, fairly similar in size, with thin bars; supporting beams rather thick, rodlike, numerous.

Measurement of the illustrated specimen:—Length of the radial spines, 12μ ; diameter of the cortical shell, 300μ ; that of the secondary medullary shell, 140μ ; that of the primary medullary shell, 60μ ; that of the pores of the cortical

shell, 20–60 μ ; that of the pores of the secondary medullary shell, 20–40 μ ; that of the pores of the primary medullary shell, 15 μ .

Remarks:—The specimens are rarely found in this collection. They resemble *Haliomma capillaceum* HAECKEL (HAECKEL, 1862, p. 426, Taf. xxiii, fig. 2) reported from the Mediterranean and Atlantic, but the former has the secondary medullary shell. This species differs from other species belonging to this subgenus.

Locality:—Station No. 9.

Actinomma (Actinommilla) erinaceum n. sp.

(Plate III, Fig. 3)

Description:—Shell very large, with three concentric spheres, and with numerous radial spines; these spines short in proportion to the diameter of the cortical shell, triangular, slender, very numerous, bristle-shaped; cortical shell globular, with 15 to 20 pores across the diameter; these pores generally large, irregular, subcircular or subelliptical, dissimilar in size, with thin bars; wall of the cortical shell very thin; secondary medullary shell obliquely depressed, in the ratio of about 0.4 to 1 of the cortical shell in diameter, with about five pores, its pores similar to the pores of the cortical shell in form and size; primary medullary shell obliquely depressed, in the ratio about 0.23 to 1 of the cortical shell in diameter, with three pores across the diameter, its pores large, hexagonal, similar in size, regular with thin bars; supporting beams thin, rodlike.

Measurement of the illustrated specimen:—Length of the radial spines, more than 32 μ ; diameter of the cortical shell, 340 μ ; that of the secondary medullary shell, 140 μ ; that of the primary medullary shell, 80 μ ; that of the pores of the cortical shell, 10–40 μ ; that of the pores of the secondary shell, 20–36 μ ; that of the pores of the primary medullary shell, 20 μ .

Remarks:—This species rarely occurs in the samples. It resembles *Haliomma erinaceum* HAECKEL (HAECKEL, 1862, p. 427, Taf. xxiii, figs. 3, 4) reported from the Mediterranean, Atlantic and Pacific, but the former has the secondary medullary shell.

Locality:—Station No. 9.

Subgenus *Actinommura* HAECKEL, 1887

Actinomma (Actinommura) antarctica n. sp.

(Plate III, Figs. 5–7)

On Superfamily Liosphaericae (Radiolaria) from Sediments in the Sea near Antarctica

Description:—Shell small, globular or subglobular, variable in size, with three concentric spheres, with about 14 radial spines; these spines generally similar in form and size, swordlike, with three blades; cortical shell with fairly thick wall, having rough surface, and with about 8 to 10 pores across the diameter; these pores large in proportion to the shell, circular or subcircular, dissimilar in size, and well-spaced; secondary medullary shell entirely globular, in the ratio of about 0.4 to 1 of the cortical shell in diameter, with ten pores across the diameter, its pores small, circular, regular, uniform in size, with fairly thick bars; primary medullary shell in the ratio of about 0.15 to 1 of the cortical shell in diameter, with five pores across the diameter, its pores similar to those of the secondary medullary shell; radial beams heavy, straight, similar to the main radial spines in form, and internal extensions of the radial spines.

Measurement of the illustrated specimen:

	Fig. 5	Fig. 6	Fig. 7
Length of the radial spine	—	40 μ	56 μ
Diameter of the cortical shell	108 μ	120 μ	92 μ
Diameter of the secondary medullary shell	44 μ	—	—
Diameter of the primary medullary shell	15 μ	—	—
Diameter of the pores of the cortical shell	16–20 μ	16–20 μ	16–20 μ
Diameter of the pores of the secondary medullary shell	4 μ	—	—

Remarks:—This species is abundant in the samples, and is one of the characteristic species of this area like *Cenosphaera antarctica* and *Thecosphaera antarctica*. It resembles *Actinomma dodecomma* HAECKEL (HAECKEL, 1887, p. 256) reported from the Tropical Atlantic, Station 348, but differs from the latter in that the cortical shell is thicker, and that the radial spines are fourteen in number.

Localities:—Station Nos. 4, 5, 6, 9 and 10.

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PLATES

PLATE I

Figs. 1 a, b, c; 2 a, b, c. *Liosphaera* (*Craspedomma*) *antarctica* n. sp.

Fig. 1, Reg. No. RAA 48 (St. No. 6); fig. 2, Reg. No. RAA 36 (St. No. 6). ×150

Figs. 3—6. *Cenosphaera* (*Cyrtidosphaera*) *antarctica* n. sp.

Fig. 3, Reg. No. RAA 26 (St. No. 9); fig. 4, Reg. No. RAA 40 (St. No. 8); fig. 5, Reg. No. RAA 26 (St. No. 9); fig. 6, Reg. No. RAA 27 (St. No. 9). ×150

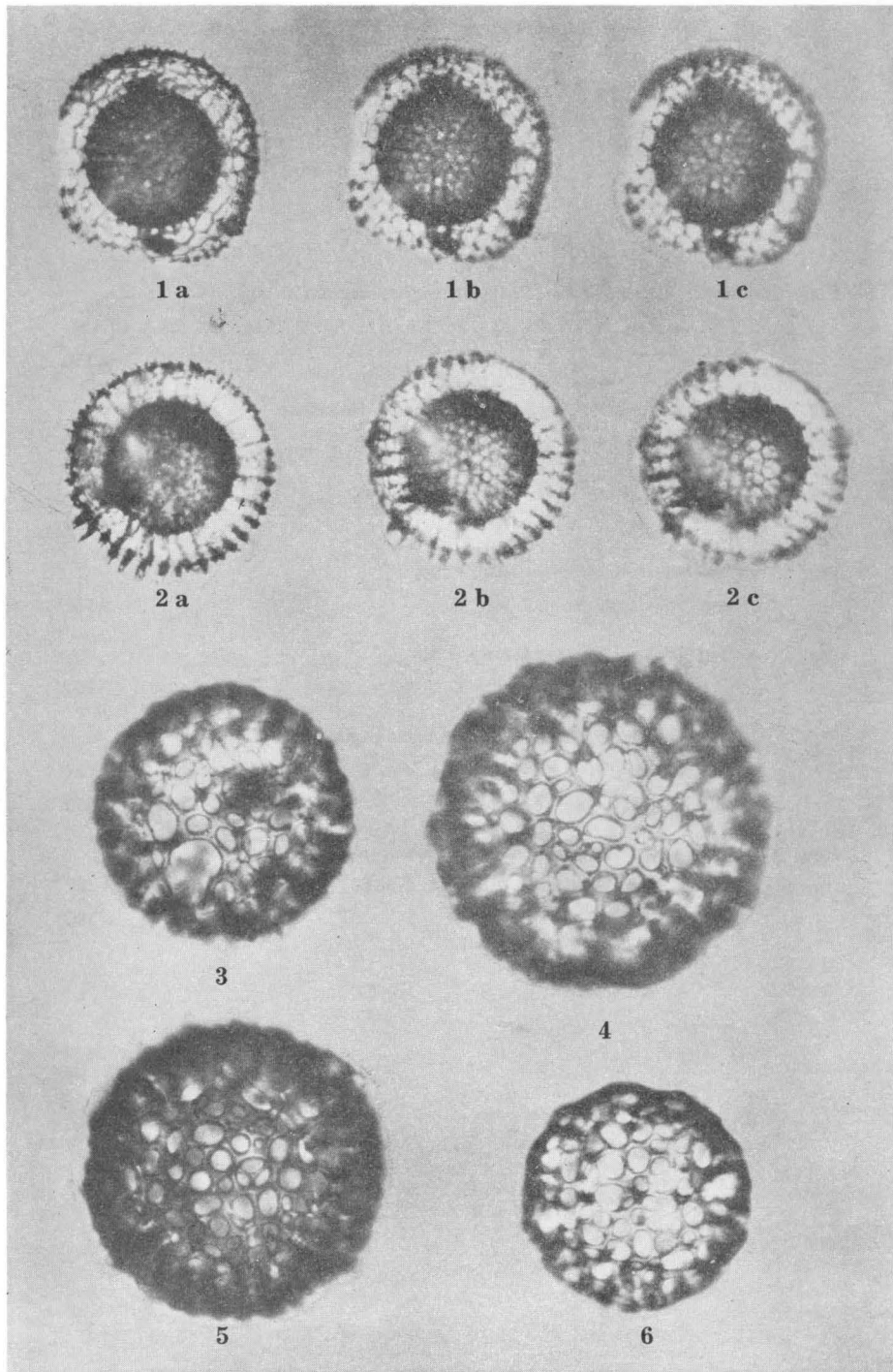


PLATE II

- Figs. 1 a, b; 2. *Cenosphaera* (*Phormosphaera*) *nagatai* n. sp.
 Fig. 1, Reg. No. RAA 13 (St. No. 6); fig. 2, Reg. No. RAA 10 (St. No. 6). ×150
- Fig. 3. *Thecosphaera* (*Thecosphaera*) *miocenica* Nakaseko.
 Reg. No. RAA 13 (St. No. 6). ×150
- Fig. 4. *Cenosphaera* (*Cyrtidosphaera*) *yosii* n. sp.
 Reg. No. RAA 48 (St. No. 6). ×150
- Fig. 5. *Cenosphaera* (*Cyrtidosphaera*) α sp.
 Reg. No. RAA 35 (St. No. 5). ×150
- Fig. 6. *Cenosphaera* (*Phormosphaera*) β sp.
 Reg. No. RAA 36 (St. No. 6). ×150
- Figs. 7; 10 a, b. *Thecosphaera* (*Thecosphaera*) *antarctica* n. sp.
 Fig. 7, Reg. No. RAA 48 (St. No. 6); fig. 10, Reg. No. RAA 27 (St. No. 9). ×150
- Figs. 8 a, b; 9 a, b. *Actinomma* (*Actinomma*) *yosii* n. sp.
 Fig. 8, Reg. No. RAA 36 (St. No. 6); fig. 9, Reg. No. RAA 27 (St. No. 9). ×150

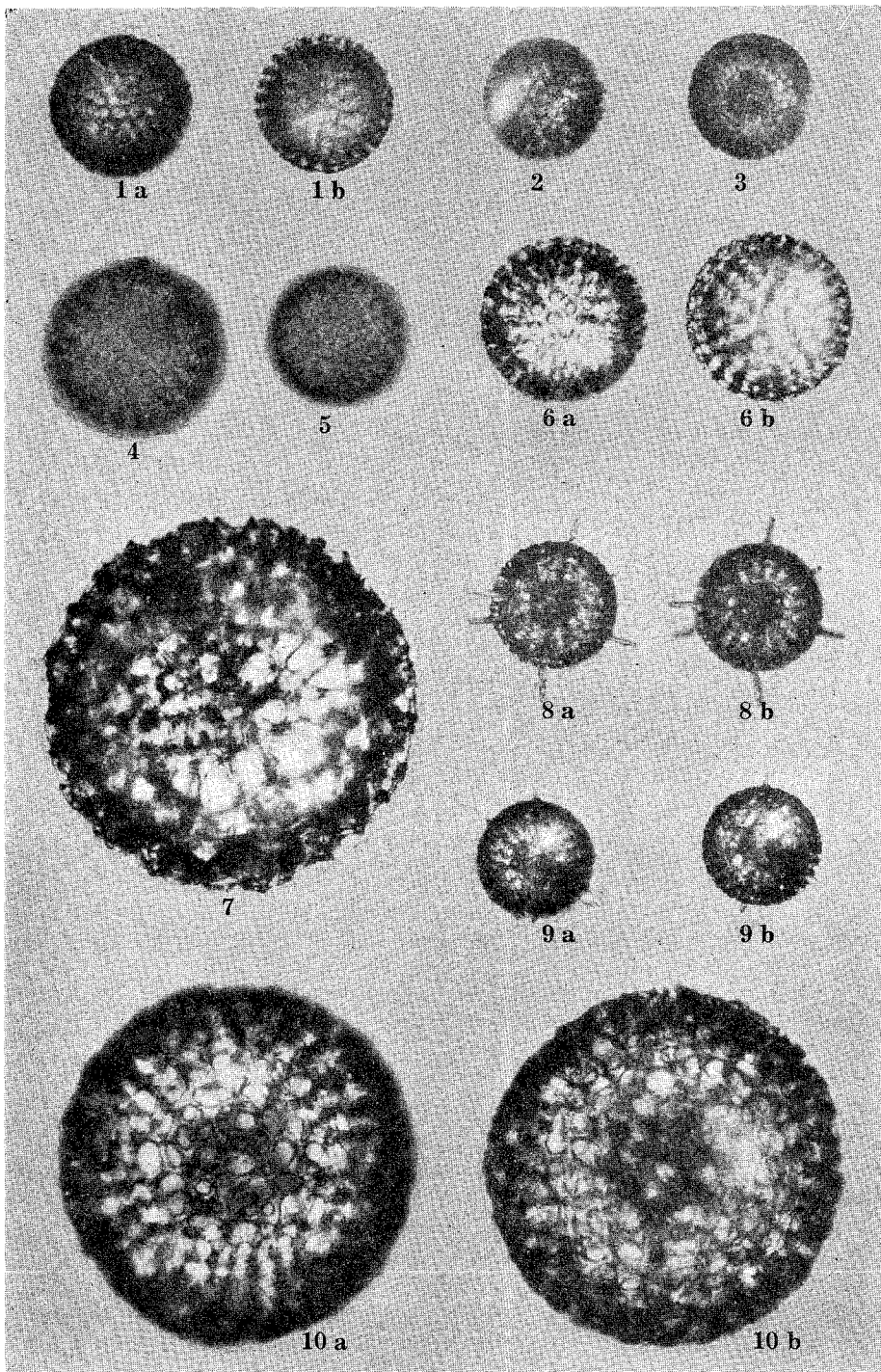
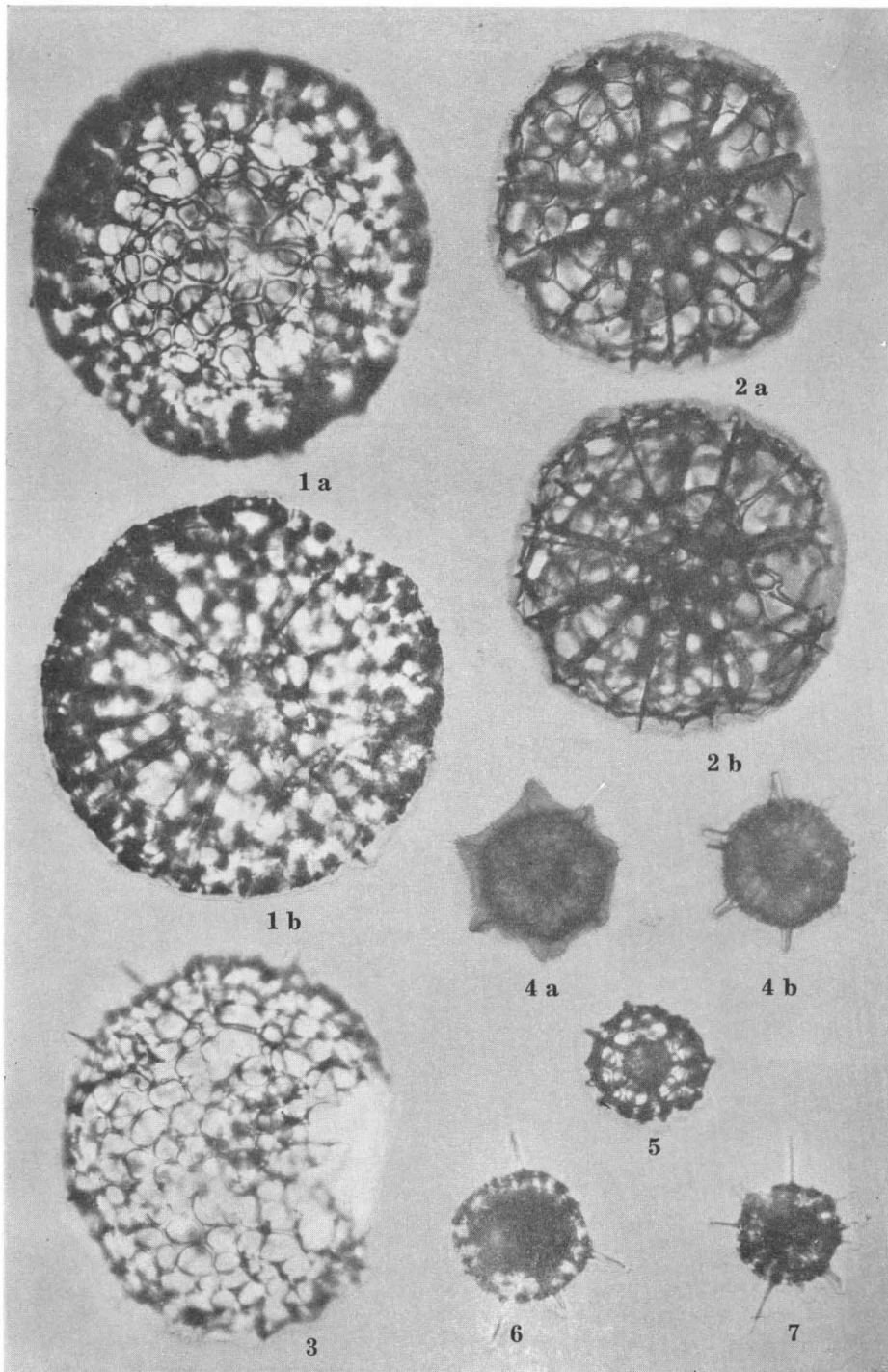


PLATE III

- Figs. 1 a, b. *Cromyosphaera nipponica* n. sp.
Reg. No. RAA 26 (St. No. 9). ×150
- Figs. 2 a, b. *Actinomma* (*Actinommilla*) *capillaceum* n. sp.
Reg. No. RAA 26 (St. No. 9). ×150
- Fig. 3. *Actinomma* (*Actinommilla*) *erinaceum* n. sp.
Reg. No. RAA 16 (St. No. 9). ×150
- Figs. 4 a, b. *Actinomma* (*Actinomma*) α sp.
Reg. No. RAA 3 (St. No. 6). ×150
- Figs. 5-7. *Actinomma* (*Actinommura*) *antarctica* n. sp.
Fig. 5, Reg. No. RAA 51 (St. No. 5); fig. 6, Reg. No. RAA 11 (St. No. 6); fig. 7, Reg. No. RAA 13 (St. No. 6). ×150



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THE JAPANESE ANTARCTIC RESEARCH EXPEDITION

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